
Central Valley Regional Water Quality Control Board

13 December 2017

Parry Klassen, Executive Director
East San Joaquin Water Quality Coalition
1201 L Street
Modesto, CA 95354

***APPROVAL OF THE EAST SAN JOAQUIN WATER QUALITY COALITION'S
2016 NITROGEN MANAGEMENT PLAN SUMMARY REPORT ANALYSIS***

Thank you for your 30 June 2017 submittal of the East San Joaquin Water Quality Coalition's (Coalition) Nitrogen Management Plan Summary Report Analysis for the 2016 Crop Year (NMP Analysis). The NMP Analysis was submitted in response to the Waste Discharge Requirements for Growers within the Eastern San Joaquin River Watershed Order R5-2012-0116-R3 (Order).

Based on the enclosed staff review, the NMP Analysis meets the requirements of the Order. Therefore, I am approving the NMP Analysis for the 2016 crop year. It is understood that the Coalition received Summary Reports from 85% of the required members in high vulnerability areas, and received additional reports after the submittal of the NMP Analysis. The Coalition is also following up with growers to improve the quality of the reported data and verify nitrogen use outliers. I appreciate the Coalition's effort to receive all of the required Summary Reports and improve the quality of the reported data.

I also approve the Coalition's request to aggregate the NMP information by crop type and by management practices in the next NMP Analysis. The Coalition should evaluate NMP data by township, soil type and irrigation practices as soon as sufficient data to compare the nitrogen consumption ratios are collected.

Outreach is an important means of ensuring Coalition member compliance with the Order and continued protection of groundwater quality. Please continue to follow up with growers to collect outstanding Summary Reports, provide feedback of the NMP analysis, and target consistent outliers with focused outreach program as outlined in the Groundwater Quality Management Plan.

If you have any questions or comments regarding the review, please contact Yared Kebede at 916-464-4828 or Yared.Kebede@waterboards.ca.gov.

Sincerely,

Original signed by
Pamela C. Creedon
Executive Officer

Enclosure: Staff Review of the Nitrogen Management Plan Summary Report Analysis

Central Valley Regional Water Quality Control Board

TO: Susan Fregien
Senior Environmental Scientist
Monitoring and Implementation Unit
Irrigated Lands Regulatory Program

FROM: Yared Kebede
Environmental Scientist
Monitoring and Implementation Unit
Irrigated Lands Regulatory Program

DATE: 16 October 2017

SUBJECT: REVIEW OF THE EAST SAN JOAQUIN WATER QUALITY COALITION'S
2016 NITROGEN MANAGEMENT PLAN SUMMARY REPORT ANALYSIS

On 30 June 2017, the East San Joaquin Water Quality Coalition (Coalition) submitted the Nitrogen Management Plan Summary Report Analysis for the 2016 Crop Year (NMP Analysis). The NMP Analysis was submitted in accordance with Waste Discharge Requirements for Growers within the Eastern San Joaquin River Watershed Order R5-2012-0116-R3 (Order).

On 24 July, staff released the 2016 NMP Analysis for a 30-day comment period, and no comments were received. This is the second year that the Coalition conducted a comprehensive analysis of the nitrogen use information reported by members in high vulnerability groundwater areas (HVAs). Staff reviewed the NMP Analysis to determine compliance with requirements of the MRP Order (Section V.C).

Overall, the NMP Analysis has met the terms and conditions of the MRP Order. The Coalition has aggregated member's nitrogen information and provided a statistical summary of nitrogen consumption ratios by crop type and township, including a summary of range, percentiles (10th, 25th, 50th, 75th, 90th), and outliers. The Coalition also evaluated the nitrogen consumption ratios for similar soil conditions and management practices, conducted quality assessment of the collected information, and provided an excel file of the summary data.

An overview of the main elements of the NMP Analysis is provided below, followed by staff recommendations.

NMP Summary Reports and Quality Assessment

For the 2016 Crop year, the Coalition received 1,043 of the 1,226 Summary Reports (85%) required from members in HVAs with large farming operations (> 60 acres). In addition, the NMP Analysis includes 754 surveys returned voluntarily by members in HVAs designated as small farming operations. Overall, the Coalition received 1,797 of the 2,819 Summary Reports (SRs) sent to all growers in HVAs. The Coalition followed up with growers and sent submittal notices in order to receive all of the required SRs and bring the members into compliance with the Order. NMP SRs received after 7 June 2017 are not included in the NMP Analysis.

The Coalition reviewed the nitrogen applied (A) and yield (Y) per acre data across all crops to determine whether reported values appeared reasonable. The Coalition attempted to contact growers whose A and Y values were deemed unreasonable, i.e., A and Y values twice above the 75th percentile of the same crop for the whole Coalition region. The Coalition removed 235 management units representing 34,689 acres, belonging to 206 members, from the data analysis because of data quality issues that could not be resolved by the NMP Analysis submittal deadline. Consequently, the NMP Analysis included complete nitrogen management data reported by 1,718 Coalition members farming 379,303 acres.

Corrective Actions and Data Analysis

To facilitate an accurate evaluation of nitrogen use and comparison of outliers: 1) the Coalition classified similar crops into specific crop types to account for variations in yield and/or nitrogen content due to harvest type (alfalfa hay vs. alfalfa silage), use (wine grapes vs. table grapes) and tree age (tree nuts), as applicable, 2) assigned a separate group for a total of 71 management units that could not be identified to specific crop types or age (e.g., Corn type not reported, almond age not reported), 3) utilized crop groups (hay, beans and citrus fruits) to increase the sample size for comparison by township, and 4) assigned each management unit to a single township to avoid duplication of management units. The Coalition has been following up with members who have not correctly reported the crop types.

The Coalition utilized the average N Removal Factors reported by Giessler (2016)¹ to estimate the nitrogen removed (R) values for almost all of the crop types used in the analysis (97% of data; 367,712 acres). However, the Coalition cautioned against interpretation of R values as the N Removal Factors are in general poor estimates for the Central Valley region. The Coalition conducted summary statistics on 3,991 management units with complete data, after excluding non-yield/non-bearing management units (554) and management units with unclear crop types (71).

Statistical Summary and Outreach

The Coalition provided summary statistics and identified outliers by similar crops and by township. The region-wide comparison of outliers between the 2015 and 2016 data show that very few members were identified as having outliers in both years, though the number of outliers in the 2016 crop year were higher for most crops (e.g., alfalfa hay, almonds, corn silage, walnuts) than in 2015, most likely due to large sample size used in the 2016 crop year. Staff acknowledges that long-term data will help the Coalition to identify consistent outliers to target for focused outreach.

The Coalition evaluated the differences in A/Y and frequency of outliers among soil types (low, medium, high hydraulic conductivity), irrigation practices (flood and pressurized irrigation practices), and N management practices (almond only). The analysis indicates no significant difference in average A/Y values and proportion of outliers by soil type and irrigation practices. However, management units that implemented irrigation water testing or split applications had lower frequency of outliers than those without either of these practices.

To provide feedback on the NMP Summary Reports Analysis to the growers, the Coalition mailed 1,167 Nitrogen outreach packets on 1 February 2017. The outreach packet includes a summary of the data that the grower reported in 2015, summary statistics for A/R values and a bell curve for comparison of each grower's performance with all other members growing the same crop. An example of the outreach packet is included in Appendix II of the NMP Analysis.

¹ Geisseler, Daniel. 2016. Nitrogen concentrations in harvested plant parts – A literature overview. Prepared for the Central Valley ILRP Water Quality Coalitions.

The Coalition also held six crop specific (almonds, pistachios, walnuts, corn, grapes and tomatoes) meetings in February and March 2017. The meetings focused on interpretation of the nitrogen use information included in the packet, nutrient management planning and crop specific educational materials. The Coalition is following up with growers identified as outliers to collect additional information regarding their nitrogen application and yield. The Coalition aims to use these surveys to further improve the quality of data, identify practical outliers, and to customize individual recommendations to promote nitrogen use efficiency.

The Coalition thoroughly discussed the caveats that limit significance of results, including the variability in the summary statistics due to unreturned SRs and poor estimates of the nitrogen removal factors. The Coalition emphasized that analysis of A/Y by township is unreliable because of insufficient sample size, occurrence of outliers in each management unit, and inconsistent thresholds used for identifying outliers. In addition, aggregation of crop types by soil type, irrigation practices and management practices were limited by small sample size.

The Coalition recommends that the summary statistics be developed by crop type only until sufficient data are collected to utilize the other grouping requirements of the Order. Staff agrees that the NMP Analysis indicates no significant difference in A/Y values between soil types or irrigation practices. However, there was a significant difference among the management practices (irrigation water testing, split applications). In addition, evaluation of currently implemented management practices is very helpful during outlier outreach meetings for improving nitrogen use efficiency.

Recommendation

Staff recommends approval of the Coalition's NMP Analysis for the 2016 crop year because it has met the requirements of the Order to the extent that Coalition members have submitted their NMP Summary Reports to the Coalition. For next year's report, staff recommends the Coalition to aggregate NMP information by crop type and management practices. Aggregation of NMP data by township, soil type and irrigation practices should resume as soon as long term NMP data are collected (5 years of NMP SR data). The Coalition should continue its follow up with growers identified as outliers to improve the quality of the reported data and identify consistent outliers for targeted outreach meetings.